

AMENDMENTS TO THE CLAIMS

Claims 1-32 (Canceled).

Claim 1 (Currently amended): A molecular memory, said memory comprising an electrochemical cell array, said cell array comprising a plurality of nanoscale electrochemical cells wherein a cell comprising said memory is a well having a cross-sectional area less than about ~~typically less than~~ 1 micron by 1 micron;

wherein a wall of said well comprises a first electrode and a second electrode said first electrode and said second electrode separated by a non-conductor or semi-conductor, wherein the ratio of the surface area of said first electrode exposed to the interior of said well to the surface area of said second electrode exposed to the interior of said well is at least about 2:1; and wherein a redox-active molecule is electrically coupled to said second electrode.

Claim 2 (Original): The memory of claim 1, wherein said redox-active molecule is a molecule selected from the group consisting of a porphyrinic macrocycle, a metallocene, a linear polyene, a cyclic polyene, a heteroatom-substituted linear polyene, a heteroatom-substituted cyclic polyene, a tetrathiafulvalene, a tetraselenafulvalene, a metal coordination complex, a buckyball, a triarylamine, a 1,4-phenylenediamine, a xanthene, a flavin, a phenazine, a phenothiazine, an acridine, a quinoline, a 2,2'-bipyridyl, a 4,4'-bipyridyl, a tetrathiotetracene, and a peri-bridged naphthalene dichalcogenide.

Claim 3 (Original): The memory of claim 2, wherein said redox-active molecule is a molecule selected from the group consisting of a porphyrin, an expanded porphyrin, a contracted porphyrin, a ferrocene, a linear porphyrin polymer, a porphyrin sandwich complex, and a porphyrin array.

Claim 4 (Original): The memory of claim 3, wherein said organic molecule comprises a porphyrinic macrocycle substituted at a β - position or at a *meso*- position.

Claim 5 (Original): The memory of claim 1, wherein said ratio is predetermined.

Claim 6 (Original): The memory of claim 1, wherein said ratio is at least about 5:1.

Claim 7 (Original): The memory of claim 1, wherein said well has a volume less than about 10 femtoliters (10×10^{-15} L).

Claim 8 (Original): The memory of claim 1, wherein said array comprises at least 100 wells.

Claim 9 (Original): The memory of claim 1, wherein the center to center distance between two wells comprising said memory is about 250 nm or less.

Claim 10 (Original): The memory of claim 1, wherein a plurality of the cells comprising said memory are independently addressable.

Claim 11 (Original): The memory of claim 1, wherein said first electrode comprises all the walls comprising said well except the bottom wall and, if present, a top wall.

Claim 12 (Original): The memory of claim 1, wherein said first electrode and said second electrode comprises all the walls comprising said well except the bottom wall and, if present, a top wall.

Claim 13 (Original): The memory of claim 1, wherein said first and said second electrode are independently selected from the group consisting of copper, silver, gold, platinum, a conducting polymer, aluminum, silicon, germanium, gallium arsenide, ruthenium, titanium and tantalum.

Claim 14 (Original): The memory of claim 1, wherein said first electrode is a semiconductor.

Claim 15 (Original): The memory of claim 1, wherein said insulator or semiconductor is an insulator.

Claim 16 (Original): The ~~electrochemical cell array~~ memory of claim 15, wherein said insulator is selected from the group consisting of silicon dioxide, silicon nitride.

Claim 17 (Currently amended): The ~~electrochemical cell array~~ memory of claim 1, wherein said first electrode is a silver electrode, said second electrode is a gold electrode.

Claim 18 (Currently amended): The ~~electrochemical cell array~~ memory of claim 17, wherein said array is formed on a silicon substrate.

Claim 19 (Currently amended): The ~~electrochemical cell array~~ memory of claim 17, wherein a plurality of the cells of said memory are independently ~~addressable~~ addressed.

Claims 20 -117 (Canceled).